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REMARKS   AUG 1 5 2006

Claims 1-27 are pending in the case. As set forth below, the Examiner objected to the claims, specification, and drawings and rejected the claims under Section 112(2) and Section 1o02 and/or Section 103. For the reasons set forth below, Applicant traverses the objections and rejections and respectfully requests a Notice of Allowance.

Claim Objection s

The Examiner objects to claims 1, 11, 14, 22, and 26 due to informalities. In particular, the Examiner contends that the act of "determining a minimum transition density . . ." is inaccurate because the minimum transition density is permanently determined at the design stage. The Examiner asserts that instead, the language should be something to the effect of "maintaining a minimum transition density . . ." Applicant respectfully disagrees and thus has not amended the claim language in this way.

The application clearly discloses that the act of "determining a minimum transition density" may be performed by a link controller 28, for example, by executing instructions to determine a minimum transition density. (See, e.g., Application at ¶¶ 22 and 30). There is no requirement anywhere that the act of determining a minimum transition density (MTD) is exclusively done at the design stage. Moreover, even if it were only done at that time (which is not taught in the disclosure), it could be a parameter retrieved by the link controller 28 (e.g., from memory somewhere in the transmitter 22), which is interpretatively encompassed by "determining a minimum transition density." Accordingly, the language as it stands is proper, and the objection should be withdrawn.

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Specification Objections

The Examiner objected to the specification for the same reason set forth above regarding the act of "determining a minimum transition density . . ." For the same reasons, Applicant respectfully disagrees, again, because this act is accurately recited, in both the claims and the specification. Whether the link controller 28 retrieves a pre-programmed MTD or generates it itself, it is "determining a minimum transition density . . ." Accordingly, this language, as used, is clear and accurate, and the objection on this ground should be withdrawn.

The Examiner also contends that the described CRC polynomial selection is not sufficiently described and is confusing because it implies that a CRC generator is selected with the aim of increasing the number of transitions in a retraining flit. The Examiner further contends that this contradicts the statement that payload, control, and error data in one retraining flit meet the link's minimum transition density requirement [citing ¶ 23], as if it calculates the multiple number of flits required in each retraining period [citing ¶ 28]. Applicant respectfully disagrees with these contentions.

Applicant's use of CRC error detection in its retraining flits is sufficiently and accurately described. For example, its use is discussed in paragraphs 24-28, 32, and 33 and with regard to Figure 7. It is especially understandable taking into account the fact that CRC error detection in communications links is well known in the art, as evidenced by the cited references.

As to the contention that the description confusingly implies that the aim of selecting a CRC checksum to increase the number of transitions in a retraining flit is confusing, this is not confusing because increasing the number of transitions is consistent with selecting a checksum that results in a retraining flit having a sufficient number of transitions. Since CRC checksum data is error data, which is part of the retraining flit (along with payload and control data), using

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a checksum with a higher number of transitions would typically result in a retaining flit having

increased transitions, which is more likely to result in the retraining flit having enough

transitions to satisfy MTD. Thus, if the disclosure implies that selection of a Checksum is to

increase retraining flit transitions, this is not in accurate and is thus not confusing.

Regarding the contention that paragraphs 23 and 28 are inconsistent with each other,

Applicant appreciates that at first glance, they may appear to be somewhat inconsistent but are in

fact consistent with one another.

Paragraph 23 states, in pertinent part:

> Specifically, link controller 28' has a data module 32 to define
> control data and payload for the retraining flit 30. An error module
> 34 determines error detection data for the retraining flit 30 based
> on the control data and the payload data. The control data, the
> payload data, and the error detection data have sufficient
> transitions to meet the minimum transition density."

Paragraph 28 states, in pertinent part:

> Generally, the link controller 28 (FIG. 1A) transmits multiple
> copies of the retraining flit 30 in order to meet minimum transition
> density. For example, retraining flits 30a-30c are transmitted
> during the first illustrated retraining period and retraining flits 30d-
> 30f are transmitted during the second illustrated retraining period.
> Knowledge of the number of transitions on each line of the
> retraining flit 30 can be used to, calculate the number of retraining
> flits that must be transmitted during each retraining period."

Thus, paragraph 28 represents that it can use knowledge of the number of transitions on

each line of a retraining flit to calculate the number of retraining flits that must be transmitted

during each retraining period. Paragraph 23 represents that the number of transitions per line is a

function of the number of transitions in the payload data, control data, and error detection data.

Thus, depending upon how many retraining flit copies can practically be transferred in a

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retraining period, the link controller would select a CRC checksum to provide a sufficient number of transitions in the error detection data. For example, it could do this by selecting the checksum with the most transitions, or depending on the structure of the retraining flit (See discussion regarding Figures 2 and 3), it could select a checksum that in cooperation with the payload and control data resulted in a sufficient number of transitions for a reasonable number of flit copy transfers during a retraining period. Accordingly, these paragraphs, along with the discussion of the use of CRC error detection, are consistent and understandable.

The Examiner also objected to the description as not sufficiently describing the transmission of signals other than retraining flits and contends that the exemplary MTD of 2-5 transitions per 1024-4096 bits seems unrealistic because it implies that retraining could be accomplished with unmodulated data without the need for retraining. Applicant disagrees with these contentions. To begin with, paragraph 23, for example, represents that the link controller periodically inserts a retraining flit into the data signal sent over the data link 26, and Figure 4 illustrates retraining flits inserted into the data signal. In view of the claimed subject matter and what is known in the art regarding derived clock links, additional discussion pertaining to the data signal or any other transmission is not needed.

Furthermore, the exemplary MTD is reasonable and does not imply that transition retraining is not needed, even for unmodulated data. For example, their may be times when no data or constant data (e.g., all 1's) is being transmitted. Thus, even a relatively small MTD does not imply the ability to simply do without a scheme that ensures that sufficient MTD is being met. Accordingly, this objection should be withdrawn.

The Examiner also contends that the way that the data module 32 operates to stagger data in the payload to reduce switching noise is not sufficiently described. Applicant

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disagrees. In pertinent part, paragraph 27 states:

> The data module 32 (FIG. 1B) also staggers the payload data
> across the payload region 42' based on switching noise constraints.
> In other words, all of the payload lines in a given transfer do not
> have the same value. Such an approach reduces simultaneous
> switching noise.

This is fairly straightforward. For example, with reference to the exemplary retraining flit of Figure 3, there is no row in the payload area where all the lines (columns) have the same value. It is well known that for proximal signal traces (e.g., lines 0 to 19 in the depicted figure), overall switching noise increases when like signals (e.g., all 1's) switch at the same time. conversely, switching different values (even if switching at the same time) will generally result in less switching noise. Thus, it is fairly clear that Applicant's description is teaching that the payload data may be assigned different values over the different bit lines for a given data transfer in order to reduce switching noise. Accordingly, this objection should be withdrawn.

The Examiner also indicated that the specification is ambiguous regarding whether an idle flit's payload and sideband regions are useful for anything besides retraining. Applicant does not understand this basis for objection. To the best of Applicant's knowledge, an idle flit is not disclosed, let alone for use in retraining. Accordingly, this objection should be withdrawn or expounded upon so that Applicant can meaningfully address it.

Drawing Objections

The Examiner objects to the drawings under Rule 83(a) because he contends that they fail to show details of CRC polynomial selecting and payload data staggering in a retraining flit. Applicant traverses these objections. Regarding CRC polynomial selection, Rule 83(a) requires that drawings must show every feature of the invention specified in the claims, but it goes on to state that "conventional features disclosed in the description and claims, where their detailed

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illustration is not essential for a proper understanding of the invention, should be illustrated in

the drawing in the form of a graphical drawing symbol or a labeled representation (e.g., a labeled

rectangular box). This is satisfied because as stated above and evidenced in the cited references,

CRC error detection is conventional, and it is shown in flow chart blocks of Figure 7.

Regarding the staggering of payload data, as explained above, it is sufficiently described

for a person of skill to adequately understand how to apply it in the context of Applicant's

invention. Furthermore, an example of it is shown in Figure 3.

Accordingly, the drawing objections should be withdrawn.

112(2) Claim Rejections

The Examiner rejected claims 1-27 as being indefinite under Section 112, second

paragraph. the Examiner asserts that the intended meets and bounds of "retraining flit" have not

been sufficiently defined to exclude an idle flit or other modulation-coded data flit. To begin

with, if this in fact is the case, the Examiner should provide relevant prior art and reject the

claims under Sections 102 and/or 103 based on the art. Notwithstanding, in the interest of

advancing prosecution, Applicant has amended the independent claims to more clearly describe

the retraining flit. In particular, the claims make it clear that the retraining flit is transmitted to

the receiver over the data link to meet the minimum transition density that has been determined.

The claims are clear and unambiguous, and the 112(2) rejections should be withdrawn.

102/103 Claim Rejections

The claims are all rejected, either under Section 102 as being anticipated or under Section

103 as being obvious, based on U.S. Pat. No. 6,941,425 to Osborne ("Osborne") and/or U.S. Pat.

No. 7,010,607 to Bunton ("Bunton"). Neither reference teaches Applicant's use of a retraining

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flit in a derived clock data link to meet MTD. This is so for either of them, alone or in combination with each other or with any of the other cited references, and the claim rejections should be withdrawn.

The Examiner contends that Osborne discloses a timer based scheme that transmits multiple flits to meet a minimum pulse density. This is simply not the case; nowhere does it disclose training or clock synchronization, let alone to meet a minimum pulse density for a derived clock data link. Rather, it is directed to optimizing memory read operations by optimizing read launches in memory interconnects. For example, it teaches a scheme that allows read packets to preempt write packets to speed up read operations. (See, e.g., col. 4, line 46). It apparently has nothing to do with retraining clocks. It does not address clock synchronization, let alone using a flit to ensure that MTD is met in a derived clock link. It speaks of flits, in general terms, as information flow units and teaches the use of error detection such as CRC with the flits. (See, e.g., col. 6, lines 1-18; col. 8, line 1). However, Applicant is not contending that the general use of error detection with flits is new. Osborne discloses the use of idle, data, and command flits to implement read and write requests but nowhere does it teach or even suggest intermittently transmitting one or more retraining flits to ensure that MTD is being met. Accordingly, the rejections relying on Osborne must be withdrawn.

Bunton also fails to teach Applicant's invention.. The Examiner asserts that it discloses an idle flit that maintains a specified minimum pulse density. This is not so. Rather, it discloses a method for training system area network (SAN) links. In particular, it teaches sending training sequences to as-sure that both ends of a link are operational at an the encoding layer. (See, e.g., col. 26, line 20+). In fact, it actually teaches away from Applicant's approach to meeting MTD requirements because it teaches the use of the 8b/10b data encoding algorithm to guarantee a

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sufficient transition density. (See col. 17, line 35+). This is a conventional data encoding approach that involves continuously transmitting encoded data to achieve sufficient bit transition density, which is fundamentally different from Applicants' intermittently transmitted retraining flits.

Thus, neither Bunton nor Osborne teach the use of intermittently transmitted flits to meet MTD criteria as asserted by the Examiner. Accordingly, all of the 102/103 rejections, which are based on Osborne and/or Bunton, should be withdrawn.

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CONCLUSION

All of the claims are in condition for allowance. Accordingly, Applicant respectfully

request the Examiner to pass this case to issue at the Examiner's earliest possible convenience.

If the Examiner believes, for any reason, that personal communication will expedite

prosecution of this application, the Examiner is invited to telephone the undersigned at 512/238-

7253.

Respectfully submitted,

Date: _August 15, 2006_

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